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SUNFLOWER COMMERCIALISATION IN SINGIDA REGION: PATHWAYS FOR LIVELIHOOD IMPROVEMENT

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ACRONYMS

ADT	animal drawn technology
APRA	Agricultural Policy Research in Africa
FHH	female-headed household
FGD	focus group discussion
HCI	Household Commercialisation Index
HH	Household
IDS	Institute of Development Studies
MDD	Minimum Dietary Diversity
MHH	male-headed household
MPI	multi-poverty indicator
NBS	National Bureau of Statistics
NREP	National Rural Electrification Programme
NGO	non-governmental organisation
SCI	Sunflower commercialisation index
TLU	Total Livestock Unit

EXECUTIVE SUMMARY

"…. and the problem with stereotypes is not that they are untrue, but that they are incomplete. They make one story become the only story." (Chimamanda Ngozi Adichie, 2009)

Sunflower commercialisation in Singida Region, Tanzania has been successful. The successes include increased oilseed production, expanding processing capacity and declining rural poverty. Singida town, the headquarters of Singida region in Tanzania, has transformed from a small sleepy town into a vibrant city over the last 20 years. Many neighbouring villages, such as Iguguno, have also been transformed into semi-urban centres because of agrarian accumulation.

Policies and efforts by development agents to promote sunflower commercialisation have increased the number of actors and service providers. Accumulation from sunflower and other enterprises including livestock have not only improved livelihoods, but also contributed to household economic diversity.

This paper examines the interactions between activities involved in sunflower production and other livelihood strategies. For example, the paper examines local dynamics in policy and business contexts that have shaped livelihood options available and people's choices of which option they undertake, and the corresponding outcomes, and reasons for such commercialisation trajectories. The study aims to inform local, regional, and national strategies, to pursue more inclusive and sustainable agriculture development, and widen options and pathways for men and women in Mkalama and Iramba districts of Singida Region.

Data was collected in 2018 using cross-sectional quantitative and qualitative methods through household interviews and focus group discussions (FGDs), and secondary data collection on the evolution of sunflower commercialisation since 1990 when sunflower emerged as a cash crop. The findings show that sunflower commercialisation in Singida, and corresponding underlying factors such as area expansion and productivity improvement, have not happened at a constant rate over the last 30 to 40 years. Household income and impacts have varied over time. This change has been driven by policy, infrastructure (roads, electrification, and communication), institutional frameworks, and farmers' resources and attitude towards risk.

As sunflower became more prominent, the number of farmers growing the crop almost doubled and yields have also increased since 2000. While sunflower commercialisation has financed household enterprises, including onions and chickpeas, sunflower commercialisation has also, in turn, benefited from other household enterprises such as livestock, onions, and chickpeas. However, increasing competition for land has reduced the area available for expanding sunflower production, as well as other crops and livestock.

The study also shows that the influence of women in controlling post-harvest activities and marketing of sunflower is declining. As a result, men have become increasingly engaged in sunflower commercialisation since it requires travelling by bicycle or motorcycle to deliver sunflower seed for processing, often outside their own villages. Cultural norms and division of labour within families make men better versed to undertake this task, hence taking more control of post-harvest handling activities for sunflower. Moreover, other forces are influencing changes related to agricultural production. For instance, traditional land tenure practices such as *nsoza* are also adapting to cope with contemporary realities on marital relations, such as increasing divorce rates which undermine trust. Since sunflower competes for resources at the household and community level, farmers adapt by changing from one enterprise to another depending on the relative prices. In addition, agro-pastoralists have had to change how they manage their herds.

Most people in Singida Region have benefited from sunflower commercialisation during its initial stages between the year 2000 and 2010, followed by crop and enterprise diversification during after 2010. Qualitative and regression analysis show that the development of crop and enterprise diversification, as their impacts have supported sunflower commercialisation, have had a stronger impact on livelihood improvement than sunflower commercialisation did alone. The livelihood outcomes and impacts show social difference in that some farmers 'stepped up', others stagnated, while others 'stepped down' into lower wealth ranks, due

to resource advantage. Female-headed households (FHHs) experienced a greater decline than male-headed households (MHHs). The findings therefore provide compelling arguments to support a diversified portfolio of livelihood options for farmers in Singida where sunflower remains an important livelihood option.

1 BACKGROUND

1.1 Sunflower sub-sector in Tanzania and Singida Region

Sunflower is the most important edible oil crop in Tanzania, grown in nearly all regions of mainland Tanzania. Estimates by the Ministry of Agriculture Food Security and Cooperatives indicate that sunflower production covered about 477,082ha, and involved about 578,245 farming households during 2016/17 in mainland Tanzania, producing 2,009.2 million tonnes of sunflower seeds (NBS, 2017b). Tanzania is an important producer of sunflower seed. The country ranks second after South Africa for sunflower production in Africa, and ranks tenth globally (ASPIRES, 2018). Nevertheless, Tanzania imports large quantities of edible oil since local production only meets about 45 per cent of the country's demand, estimated to be between 300,000–400,000t/year (Balchin, Kweka and Mendez-Parra, 2018).

The importance of sunflower as a cash crop has increased gradually during the last 30 years, particularly in Singida and Dodoma regions, which are both major sunflower-producing regions. Since 2010, sunflower production has accelerated in part due to growing demand for sunflower oil. This can be attributed to its healthy attributes and rising demand for sunflower cake for animal feed in local and export markets (Balchin, Kweka and Mendez-Parra, 2018). The resulting area expansion and increased processing capacity over the last 20 years has resulted in much of the economic transformation and livelihood improvement (Zilihona, Mwatawala and Swai, 2013; Mgeni *et al*., 2019).

The status of sunflower in the country, and in the central regions of Dodoma and Singida, have been the result of many policy changes and interventions by the government in collaboration with development partners and non-governmental organisations (NGOs). These efforts have aimed to promote sunflower production and processing for poverty reduction in the central regions, which are the poorest in the country (Kessy *et al.*, 2011). Prior to 1986, Tanzania pursued socialist policies where the government assumed a leading role in controlling different aspects of the economy through centralisation. The year 1986 marks a turning point in Tanzania's political economy when, adhering to recommendations from the International Monetary Fund, policy changes towards economic liberalisation were introduced in 1986, whereby the private sector assumed an active role in economic development (Hyden, 1993). In 2007, the country's agricultural policy of 1981 was revised to conform to post-economic liberalisation priorities, which overtly encouraged private sector engagement in agricultural transformation. This was followed by other policy reforms including the Land Acts (1999), Agricultural Sector Development Strategy (2001) and Agricultural Sector Development programme (2005–2013). The interventions included supporting breeding programmes to increase access to improved seeds, expanding the extension service to improve agronomic practices, promoting processing technologies, and coordinating marketing through cooperatives and parastatals. As a result, farmers' and other value chain actors have made sunflower the most important cash crop in Singida Region.

However, the history of Singida Region's economic development goes beyond sunflower, as sunflower production expanded only after 2000. Prior to 2000, sunflower in Singida region was mainly a subsistence crop, produced to meet family needs. Limited surplus was sold within neighbourhoods to meet local needs for oil and generate some cash income for farmers. During the last 20 years, however, sunflower production has expanded to cover a larger area and involve more people (Figure 3.1), and other livelihood opportunities have emerged. In addition to livestock production, which is an important economic activity in Singida, the region is also a leading producer of onion, chickpea, and cotton in Tanzania. Some crops, such as onions and chickpeas have benefitted from sunflower expansion, as discussed in Section 3.2.3. More recently (since 2010), the government has also been promoting cashew nut production to increase farmers' diversification options.

Using data from a 2018 study on sunflower commercialisation in Singida Region, by the Agricultural Policy Research in Africa (APRA) consortium, this paper explains how farmers in Mkalama and Iramba districts in Singida have responded to opportunities from resource endowment, policy, and institutional environment. The farmers' reactions have been assessed based on

resource allocation, local institutional adaptation, and how such choices have affected their accumulation of assets, changes in food and nutrition consumption of their households, and other livelihood changes within the communities.

This paper asserts that while sunflower has contributed to agrarian accumulation, it is only part of the story. The purpose of the study was to identify factors which interact and influence these dynamics in relation to sunflower commercialisation and other livelihood options over a long period, and how such interactions have widened the scope of options and influenced livelihood pathways for men, women, and young and old people in Singida. The paper also examines how these options and people's choices have been mediated by local dynamics, national policy, and business environment.

1.2 Livelihood pathways and agrarian change

The pursuit for a better life is an on-going concern within communities and countries, involving constant adjustment as individuals and families seek vantage points or opportunities, which will improve their livelihoods. Agrarian change takes into account occurrences within agrarian structures including production relations, as well as overall social and economic institutions that determine the pace of agricultural growth (Ponte, 2000; Rigg, 2006; Long and Wang, 2010). Agrarian change is driven by structural transformation based on relations across class, gender, ethnicity, age, and race, because these differentiations determine power relations and access to resources. These are also mediated by the existence of well-established economic ties and access to major markets.

In this regard, development processes are often facilitated by factors that are internal and external to communities. Ellis and Mdoe (2003) argue that global, national, and local environmental factors, encompassing economic, political, institutional and market factors, provide the platform from which individual actors construct their pathway out of poverty. Poverty reducing accumulation involves trading up assets, from chicken to goats, cattle and even land. Other pathways may involve selling chickens, then using that income, to finance non-farm activities. This in turn facilitates acquisition of farm inputs, leading to higher income, hence enabling farmers to buy land and livestock. This is in line with the literature, affirming the importance of asset accumulation as an indicator of livelihood improvement (Beegle De Weerdt and Dercon, 2006; Wilhelm *et al*., 2018). Development processes can be slow, occurring over a long period, or fast, depending on the underlying factors. The history and local political economy of an area can have significant impacts on how agrarian change happens in practice, and its implication for class and gender relations (Dancer and Sulle, 2015).

In any country or society, the drivers, which are often intertwined with local historical and social perspectives, present different opportunities and/or challenges to different people, depending on the location and time. For example, successful agricultural intensification should improve the productivity of land and labour (Larsson, 2001), which is assumed to ultimately contribute to improved food security at the household level and economic development. Productivity improvement also induces agricultural commercialisation as farmers increase their share of marketed surplus over time (Jayne *et al*., 2011; Andersson, 2013). This enables them to accumulate farm and non-farm assets, which further improves farm productivity while non-farm assets such as houses, radio, and transport facilities improve people's wealth status.

However, the course or trajectory from intensification to improved livelihoods is not always guaranteed. According to the neo-classical perspective, farmers are expected to make rational choices to maximise their objectives, considering the multifunctionality of agriculture and the intervening factors around them (Debertin, 2012). Thus, it is not asset ownership, rather it is the breadth of opportunities to construct such asset accumulation pathways that lead to rising prosperity over time.

Opportunities to pursue such pathways depends not only on the environment but also on farmers' good judgment to identify favourable opportunities and their sharpness to respond quickly to create that space. Ellis and Mdoe (2003) identified disabling factors which can impede such entrepreneurial spirit, therefore posing challenges to intensification and agricultural structural change through commercialisation. Such disabling factors include ineffective markets, a disabling public sector and deteriorating civil society. Farmers' judgement is, however, subject to negotiations within networks, which range from matrimonial and intra-household relations to the community level. Berry (1993) asserts that accessing resources, especially labour, was historically the most limiting factor in many African communities. The opportunities, such as commercialisation, and challenges, such as gender division of labour and cultural norms, provide a platform from which farmers and household members negotiate their space (within the household or community) to establish their path out of poverty.

Some succeed in the process, others are pulled down, while others stagnate.

This is consistent with the conceptual framework adopted by APRA, which examines how smallholder farmers engage in commercialisation and the effects their choices have on their livelihoods. The analytical framework envisages that agricultural commercialisation opportunities may enable some farmers to improve by investing in existing activities (stepping-up). Others may accumulate wealth from agriculture and opt to diversify to alternative non-farm economic activities (stepping-out). Yet others may be encouraged to join commercial agriculture from a non-farm background to benefit from the opportunities provided by commercialisation (stepping-in). However, not everybody gains when opportunities arise. Some farmers may stagnate or 'hang-in', which maintains farming at subsistence levels, with people barely surviving, while others may 'drop-out', often due to shocks, resource constraints or other challenges they may face (Dorward, 2009).

Drawing from APRA's general conceptual framework, this paper aims to assess how farmers in Iramba and Mkalama districts of Singida Region have adapted and used agricultural commercialisation opportunities during the last 30 years. Using qualitative and quantitative data, the analysis and discussion attempts to explain how different categories of farmers facing different conditions made choices that propelled them into different portfolios of economic activities and the corresponding livelihood outcomes. The analysis aims to inform future policy and investment decisions to promote more inclusive and sustainable agricultural commercialisation not only in Singida region but throughout the country.

2 METHODOLOGY

2.1 Study area and data

The study was conducted in Singida Region, which was purposively selected due to its long history (since the 1970s) of sunflower production. Singida is in the central part of mainland Tanzania, between latitude 30^0 52' and 70^0 34' south of the equator, longitudes 220^0 27' and 350^0 26' east of Greenwich. Singida Region has five districts: Singida rural, Itigi, Manyoni, Mkalama and Iramba, and one urban council (Singida urban). Iramba and Mkalama districts were selected because they have been leading in sunflower production, accounting for nearly 50 per cent of sunflower from Singida Region (URT, 2006; URT, 2012a; NBS, 2017a; URT 2020). Iramba district is located on the plateau above the Rift Valley, while Mkalama district is in the Rift Valley (see Appendix 1). While both rural districts, a highway to Mwanza passes through Iramba, and there are rural roads in both districts, which are critical for facilitating crop commercialisation. In addition, there is infrastructure such as electricity, oil mills and mobile phone coverage in both districts, which supports commercialisation and facilitates their comparison.

The study used a mixed methods approach to collection data and conduct analysis to address several issues of equity and inclusion in relation to agricultural commercialisation, which are the focus of the APRA programme. The methods included: (i) a review of existing documents on sunflower production in Singida Region; (ii) FGDs; (iii) key informant interviews; (iv) a household survey; and (v) observation. Qualitative data was collected in October 2018 through FGDs and key informant interviews, while quantitative data was collected through a household survey.

The FGDs involved 205 participants (23 per cent female and 77 per cent male) comprised of 7–15 people who were either traders, processors, elders or opinion leaders selected per village based on diverse gender, age, and location variables, across each of the 15 villages. FGD participants from each village further selected 70 households from each hamlet per village, totalling to 963 households. The FGDs discussed improvements, and stagnation or decline in livelihood experienced by the households during the past 5–10 years in relationship to sunflower production and other livelihood options.

Key informants' interviews involved 137 people (24 per cent female and 76 per cent male) comprised of village leaders and government employees, who were selected because their positions allowed them to provide information relevant to the study. A quantitative survey was conducted in 2018 in seven villages in Mkalama district from a sampling frame of 74 villages, and eight villages in Iramba district, from a sampling frame of 85 villages (Boniface and Aku, 2019).

The survey involved 601 households (13.6 per cent and 86.4 per cent male) representing an equal number of 40 randomly selected sunflower-producing villages. Regression analysis was used to discern the influence of sunflower and crop commercialisation on livelihood indicators, multi-poverty indicator (MPI), food security and minimum dietary diversity (MDD).

2.2 Assessing agrarian change

This study employed three perspectives to undertake data analysis for assessing agrarian change: evolutionary, structural political economy, and conjectural historical perspectives (Earle and Spriggs, 2015; Vanberg, 2018). These perspectives cover a wide range of factors that influenced actors to make decisions leading to the course of action they took with respect to sunflower commercialisation. The evolutionary perspective documented the history of sunflower in relation to social, technical, institutional, and cultural factors. A review of the literature revealed a scarcity of studies which document the evolution of sunflower production, marketing, and processing in Singida Region. Although a Tanzania National Bureau of Statistics (NBS) agricultural sample survey from 2002/03 (NBS, no date) contains comprehensive data on agricultural production, including livelihood indicators for Singida region, qualitative analysis of the data is lacking.

Hence, the current study used evolutionary and conjectural historical perspectives on qualitative data from the FGDs and key informant interviews. Data was

analysed through comparison of different narratives to identify similarities, differences, and trends in sunflower commercialisation in Singida since the 1990s, when the region began to actively engage in sunflower commercialisation.

The structural political economy perspective was assessed using quantitative data from household agricultural sample surveys which were conducted in 2002/03 and 2007/08, and APRA household survey data which was collected in 2018 due to the absence of comparative literature. Data from the 2002/03 agricultural sample survey was used as a baseline for comparison with the 2007/08 NBS agricultural sample survey (NBS, no date) and APRA survey data (2018) which provides the third cross-section of the panel.

This study compares a range of indicators such as land and input use, yields, the value and price of crops which are sold, and the household commercialisation index (HCI). Quantitative data was analysed using Excel and STATA software to get a range of descriptive indicators which were used to compare sunflower production and marketing activities of different categories of respondents during different times.

The outcome of farmers' choices in agricultural production, manifested in livelihood attainment, is measured by intermediate indicators such as asset ownership, income, poverty, food security, and more aggregate indicators such as the MPI. These indicators are used to compare the performances of different categories of farmers. The quantitative and qualitative analyses aim at determining the causes of the observed differences in pathways in relation to the attainment of livelihoods as observed in the APRA survey which was conducted in September 2018.

3 DISCUSSION OF FINDINGS

3.1 Evolution of sunflower in Singida Region

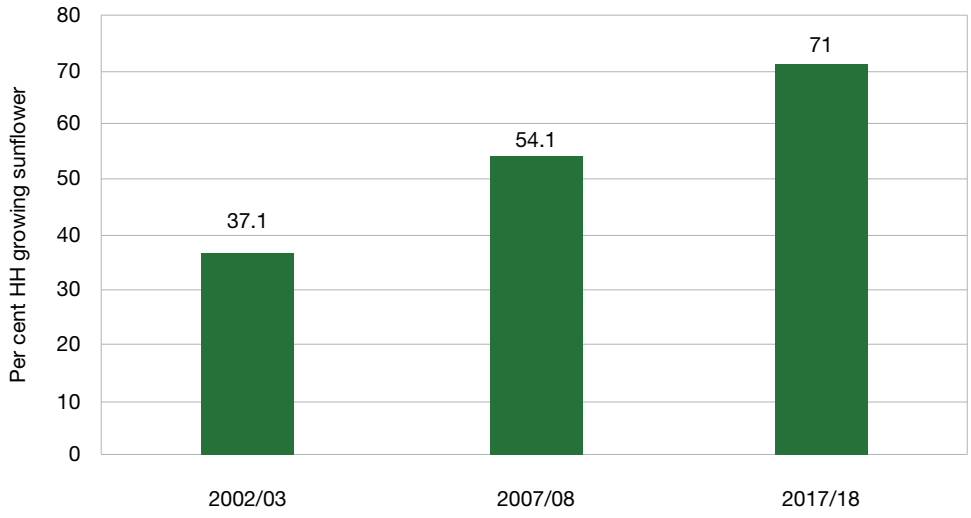
3.1.1 Sunflower as an emerging economic activity

Singida and Dodoma regions lead in the evolution of sunflower from a subsistence to a commercial crop which is grown by over 4 million households, and involves many actors and service providers along the crop value chain in Tanzania (Mgeni et al., 2019). We use data from FGDs and key informant interviews conducted during this study due to the absence of literature on the history of sunflower development in Singida region.

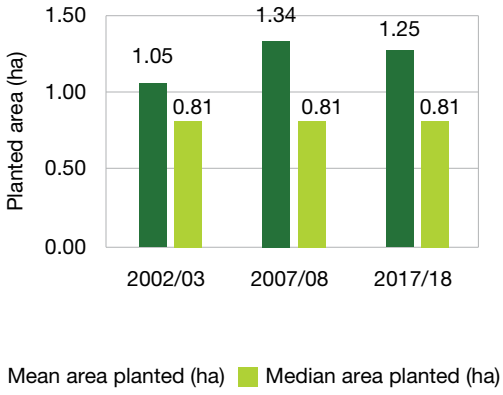
The study found that sunflower production in Singida Region traces back to the 1960s and 1970s, when the crop was grown by a few farmers on a subsistence

Figure 3.1: Declining mean planted area and sunflower yield due to competition for resources

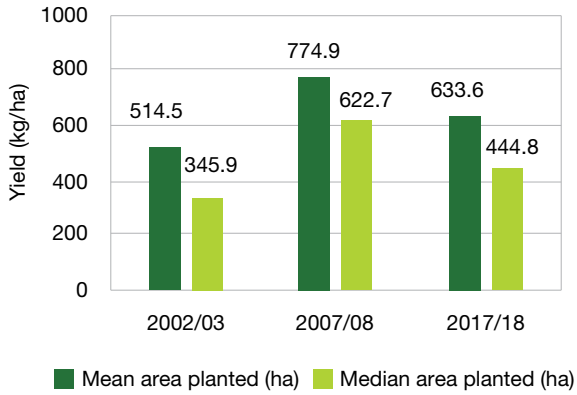
(a) Per cent of households growing sunflower



(b) Planted area per household



(c) Mean and median sunflower yield



Note: HH = household

Source: Adapted from NBS (no date) and authors' data (household survey)

basis. Women processed the crop by pounding sunflower seeds using a mortar and a pestle, then boiled the pounded seed to extract oil for domestic consumption and for sale in local markets (Isinika and Mwajombe, 2019).

Sunflower production increased after 2000 following fruitful efforts by the government, development partners and NGOs in the promotion of sunflower production to address poverty in Singida Region. The household budget survey which was conducted in 2000/01 classified about 55 per cent of households in Singida Region as poor based on the basic needs indicator, but the proportion of poor households declined to 49 per cent in 2005 and to 26.4 per cent in 2018 (Kessy et al., 2011; World Bank Group, 2019). The proportion of households which grow sunflower has almost doubled from 37 per cent in 2002/03 to 71 percent in 2017/18.

Table 3.1: Production trends of major crops in Iramba and Mkalama districts

Crop	Area (ha)					
	2002/03		2007/2008		2017/18	
	Mean area (ha)	Mean yield (kg/ha)	Mean area (ha)	Mean yield (kg/ha)	Mean area (ha)	Mean yield (kg/ha)
Sunflower	1.05	514.5	1.3	774.9	1.25	633.6
Maize	0.99	365.7	1.05	1,633.8	1.4	1,027.9
Sorghum	1.05	199.6	1.13	1,256.5	0.4	666.9
Chickpeas	1.13	443.3	0.93	728.4	1.5	644.2

Source: Compiled from data obtained from NBS (2003 and 2008) and authors' data

Table 3.2: Percentage of farmers who produce crops and keep livestock

Serial number	Economic activity	2002/03 (n = 450)	2007/08 (n = 405)	Ranking	2017/18 (n = 601)	Ranking
1.	Maize	80.4	76.3	1	83.9	1
2.	Sorghum	44.0	50.6	3	55.6	3
3.	Sunflower	37.1	54.1	2	71.1	2
4.	Common beans	16.2	6.2	6	11.6	4
5.	Groundnuts	14.0	10.6	5	8.8	6
6.	Bulrush millet/pearl millet	11.1	16.8	4	7	8
7.	Sweet potatoes	5.8	5.4	7	5.3	10
8.	Cassava	3.1	0	11	2.2	11
9.	Chickpeas	1.6	3.7	8	10.3	5
10.	Rice/paddy	1.3	3	9	6	9
11.	Onions	0.4	0	12	7.3	7
12.	Finger millet	0	0.7	10	0.5	12
13.	Cotton	0	1.7	9	0	12
Livestock						
	Livestock type	Percentage of households which keep livestock		Mean number of animals/ birds		
		20007/08	2017/18	2007/08	2017/18	
14.	Cattle	41.6	69.4	9.6	7.5	
15.	Goats	32.5	69.4	2.8	4.2	
16.	Sheep	21.4	35.6	2.1	2.3	
17.	Pigs	5.2	4.2	6.2	0.1	
18.	Poultry	67.4	80	10.6	8.7	

Source: Compiled from data obtained from NBS (2003 and 2008) and authors' data (household survey)

Corresponding changes for other crops were not so dramatic. The mean area under maize and chickpeas declined slightly between 2002/03 and 2007/8, while that of sorghum increased slightly (Table 3.1) and the proportion of maize-producing households remained stable at 80 per cent. Households which produced sorghum increased slightly by 11.6 per cent while the number of households producing chickpea increased by 8.3 percent (Table 3.2).

Production trends for sunflower are consistent with findings from the FGDs and key informant interviews, confirming that sunflower production increased during the last 20 years. Expansion of sunflower production, especially into mbuga or black cotton soils, which were traditionally reserved for livestock grazing and are now also used for production of chickpeas, also increased competition for land. Consequently, farmers have reduced fallowing intervals to adapt to land pressure and this has led to declining land productivity in Singida Region where the use of inorganic fertiliser and manure remains low. Sunflower production also expanded into wooded thickets, and this has further strained the fragile vegetative ecosystems, which are also used as grazing areas for livestock. Adaptation of livestock farmers to these changes are discussed below (Section 3.2).

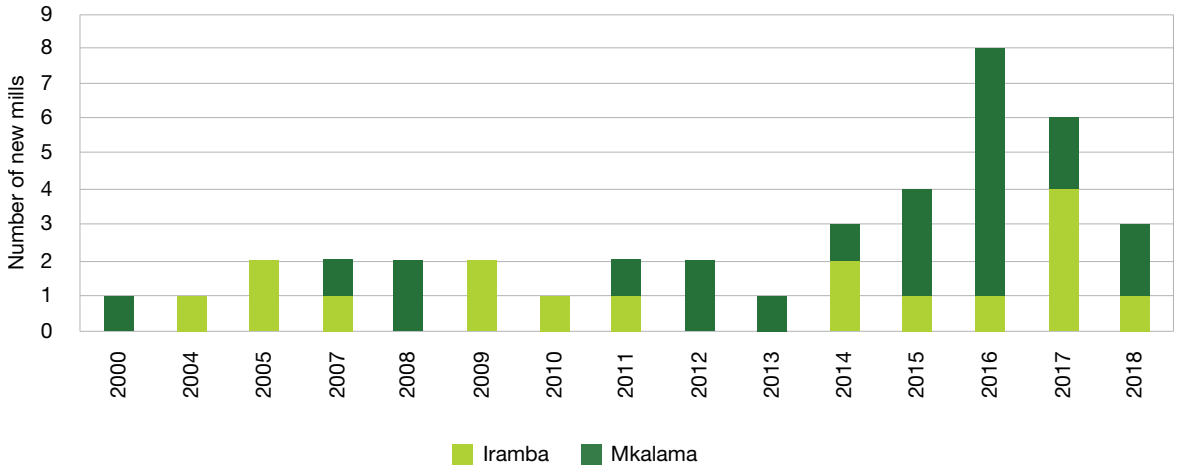
3.1.2 Enabling and disabling factors

The FGDs and key informant interviews attributed increased sunflower commercialisation to different factors. One major cause for the observed positive trend of commercialisation is the increasing number of processors which is fuelled by road improvements, electrification, and increased use of mobile phones. Before the improvements in transport, farmers and traders cycled long distances to process sunflower seed into oil for domestic consumption and for sale in the local markets. Until the 1980s, the nearest oil processing mill in Mkalama district was in Iguguno village, a distance that can take 12 hours while cycling from most of the villages.

Increased electrification in rural areas under the National Rural Electrification Programme (NREP), has led investors switch from diesel energy to electric oil processing mills which are more efficient. Rural electrification has made it possible to introduce electric processing mills in remote villages that previously did not have any. As a result, farmers and traders now travel shorter distances to the processing mills. Moreover, all villages are now accessible throughout the year due to ongoing improvement of rural roads. Increasing use of motorcycles has also significantly improved transportation of sunflower seeds to milling centres (Isinika and Mdoe, 2019). Besides, 73.7 per cent of households in Singida Region use mobile phones and this has enhanced their access to motorcycle service providers who are only a phone call away.

Since 2005, there has been a mutual influence between increasing sunflower production and processing capacity, the greatest increase in processing capacity being the period after 2013 (Figure 3.2). Until around 2010, there was enough land to increase sunflower production by existing farmers and new entrants. The proportion of farmers who produced sunflower increased from 37.1 per cent in 2002/03 to 54.1 per cent in 2007/08 (Table 3.2). This expansion has been enhanced by a complementarity relationship between sunflower production and livestock, in which livestock provide sunflower farmers with manure and animal drawn technology (ADT) for cultivation and transport, while sunflower is processed into cake, which is used to feed animals that work in the farms and for fattening steers (Mdoe *et al.*, 2021).

Figure 3.2: New sunflower oil processing mills installed per year in Mkalama and Iramba districts



Source: Authors' own

Most of the seed cake is exported and only a small proportion is sold in local markets (Dalberg, 2019). In addition, proceeds from the sale of seed cake are used to buy livestock, which is considered a store of wealth in Singida Region. Consequently, more farmers have used income from the sale of sunflower and other crops to buy livestock (Table 3.1), thereby upgrading these households' wealth status according to local criteria.

Demand for sunflower seed by processors introduced a group of traders who buy from farmers, and then aggregate and sell sunflower seed to processors. Most farmers do not engage in collective marketing since they do not belong to farmers' organisations because they are weak. Only 1.7 per cent of the respondents in the household survey sold their sunflower through cooperatives or farmers' organisations compared to 65 per cent who sold their produce through traders and processors (Mdoe et al., 2021). As a result, traders are likely to remain key actors along the sunflower value chain. These traders often recruit aggregators who are locally called nyoka, meaning snake, to move from house to house buying sunflower seeds. Some famers borrow money from these aggregators to finance their farm operations during growing seasons, then pay in-kind by giving the aggregators sunflower seed during harvest. These loans are often expensive and exploitative to farmers.

At the time of data collection (2018), the lending rate in most villages was TSh40,000 (about US$18.2) in return for one bag (65–70 kg) of sunflower seed valued at TSh55,000 (US$25). The global lending rate for payment-in-kind in 2020 was about TSh27,000 (US$12) in return for one bag of sunflower seed valued at approximately TSh52,500 (US$22.9). The slight decline in prices reflects fear and uncertainty in 2020 when the COVID-19 pandemic struck, even though there was no lockdown in Tanzania (Boniface and Magomba, 2020).

Demand for sunflower oil has been rising due to health reasons, because sunflower oil is considered to be cholesterol free. Moreover, there is increasing supply of semi-refined sunflower oil in local Tanzania markets. However, consumers substitute between sunflower and palm oil depending on the relative prices. At low levels of income and education, there is a higher preference for palm oil, which is cheaper palm oil (Balchin, Kweka and Mendez-Parra, 2018) implying that for such consumers, affordability overrides health concerns.

Sunflower seed markets became more reliable between 2000 and 2010 and prices increased from TSh10,000 to TSh50,000 per bag, equivalent to US$12.4–41.1 (Isinika and Mwajombe, 2019). More farmers were attracted to sunflower production during the same period because production of the crop was considered cheaper in comparison to other crops such as cotton and groundnut. Moreover, sunflower is drought tolerant and well-suited for Singida which is a semi-arid region. Local sunflower varieties such as record were released and this increased sunflower yields.

Farmers were also trained in the use of pesticides, which increased the number of farmers who bought pesticides from existing input suppliers, leading to higher yield due to reduced losses from pests. Further, many farmers used loans from savings and credit groups, commonly known as village community banks, to expand sunflower production, leading to higher incomes. This income was used to improve farmers' livelihoods resulting in diversification to other crops and enterprises. Similar diversification strategies have been reported among farmers in the neighbouring Dodoma Region (Wilhelm et al., 2018).

3.2 Changing dynamics

3.2.1 Sunflower and livestock: competition and complementarity

As sunflower production expanded into virgin land, the use of inorganic and organic fertiliser in sunflower production remained low. By 2017, only 14.1 per cent of the respondents used inorganic fertiliser, (20.9 per cent in Mkalama district and 8.2 per cent in Iramba district). Use of pesticides in these districts remain low, forming 15 per cent of the households. More farmers (39.7 per cent) use manure especially in Mkalama district (51.4 per cent) compared to 29.3 per cent in Iramba district. Diversity of crops and increasing number of livestock has increased demand for labour in both districts.

Expansion of sunflower and other crops into traditional grazing areas such as *mbuga*, or black cotton soils, reduced grazing areas and this displaced livestock. Farmers who own large herds of cattle, mostly agro-pastoralists who belong to the *Wasukuma* tribe, have migrated westwards to Ikungi and Itigi districts where sparsely-populated miombo woodlands still exist. Some of these farmers have distributed their cattle to caretakers, mostly family members, neighbours, and friends. About 9 per cent of the respondents took care of other people's cattle while 60.7 per cent owned cattle. The proportion of households which kept livestock increased from 41.6 per cent in 2007/08 to 69.4 per cent in 2018 (Table 3.2). There were more people who did not own cattle in Mkalama (34.6 per cent) compared to 26.4 per cent in Iramba, implying that most farmers in Mkalama district only engage in crop production, and being non-pastoralists they accumulate wealth in other forms such as shops, rental houses, transport facilities and other business.

These changing dynamics resulted in new negotiated social and economic interactions, as in the case of livestock owners and caretakers in which livestock owners are relieved of the pressure of managing large herds, while caretakers benefit from milk and manure from the cattle. However, the caretakers must seek permission from the cattle owners before using their cattle to perform farm work such as ploughing. Some caretakers have improved their livelihoods by using proceeds from the sale of manure and milk to buy livestock. Further, some medium-scale farmers have hired out ADT services to large farmers (Isinika and Mwajombe, 2019). Gender and other elements of social relations have also been changing, as explained in Section 3.2.2.

3.2.2 Gender and cultural dynamics

Until the early 1980s, sunflower was a subsistence crop in Singida Region. As commercial production of the crop increased from 1990 onwards, postharvest handling of sunflower gradually shifted from women to men who increasingly managed the process (harvesting, beating, drying, and selling). Men took over sunflower processing when it changed from a pounding and boiling chore performed by women using a mortar and a pestle to modernised processing. Men ferried bags of sunflower seed using bicycles, motorcycles, or vehicles to processing facilities, often located outside their respective villages. Although participation by men in sunflower processing relieved women of the burden of carrying sunflower seeds to distant mills, this transition also disempowered women.

Other studies have similarly established that when crops or enterprises become commercialised, women lose out, as men take control of resources and marketing output (Fischer and Qaim, 2012; Bernhardt et al., 2019). As the story of women being side-lined from sunflower commercialisation evolves, so do their efforts to address the challenge they face as family and community members. Consequently, women seek new vantage positions within their networks. For women to negotiate their way into more favourable poverty reducing pathways, they must first negotiate spaces within existing gender frameworks in their households, community, and society (Doss, 2001). Such dynamics, in which women seek better positions, were seen in FGDs which were conducted in the 2018 APRA survey. While some women accepted the status quo as a cultural norm, women in some villages sought to change their position using different ways. One initiative was reported in Isene village where women successfully combined cultural and modern institutions to transform a traditional self-help group into a village community bank, in which women took a bigger role in decision-making, consequently benefitting not only the women but also entire families through livelihood improvement (Isinika and Mdoe, 2019).

Nsoza, a traditional practice which gives women a right to their husbands' land upon marriage, albeit with a responsibility to meet certain household needs, presents a gender dynamic to land ownership in Singida Region. *Nsoza* was reported in 14 out of 15 villages in the 2018 APRA survey. An exception was reported in Zinziligi village, one of the selected study villages, where focus group members said *nsoza* was no longer practiced due to increasing family disharmony and divorces. This may mark the beginning of a cultural transformation to reflect not only changing conjugal economic relations, but also increasing land scarcity, which as noted earlier (Figure 3.1), reduces the mean area planted with sunflower per household.

Some women opted to wage silent rebellions, as has been the case when women have resisted using technologies that increased their labour burden (Pandolfell, 2010), or where women do not benefit

Table 3.3: Number and proportion of households which produce and sell food crops

Serial number	Crop	2002/03		2007/08		2017/18	
		Producing (N)	Selling (%)	Producing (N)	Selling (%)	Producing (N)	Selling (%)
1.	Maize	328	10.1	303	38.6	443	34.3
2.	Sorghum	167	7.2	198	66.7	324	19.1
3.	Bulrush millet/pearl millet	46	2.2	68	33.8	42	38.1
4.	Common beans	61	8.2	25	32	68	20.6
5.	Groundnut	57	17.5	43	51.2	50	18
6.	Sweet potato	20	5	22	27.3	30	3.3
7.	Finger millet	0	0	3	33.3	3	66.7
8.	Paddy rice	5	0	12	66.7	34	67.6

Source: Compiled from data obtained from NBS (2003 and 2008) and authors' data (household survey)

proportionally from their contribution. One woman from Wembere village noted that "If I am marginalized in sharing benefits from sunflower, I will ensure that during the next season, I will silently withhold my efforts towards the sunflower farm so that we all lose." Berry (1993) states that most farmers in Africa rely on labour mobilised from social networks and consequently face challenges with control since labourers, even from within the family often maintain a high level of autonomy.

The on-going COVID-19 pandemic has compounded challenges related to the marketing of sunflower. This is because fewer traders go to farms to buy sunflower seed. This has reduced competition among traders and consequently reduced the price of sunflower seed compared to 2009. Processors reported low demand for sunflower seed cake due to reduced export following export restrictions, slow movement of cargo trucks to the neighbouring country of Kenya, and reduced shipment to India, which are both leading importers of sunflower seed cake from Tanzania.

3.2.3 Diversification and competition

Sunflower is not the only crop which is grown in Singida Region (Table 3.1). The region also produces food crops such as sorghum, millet, and sweet potatoes. Income from the sale of sunflower has been used to finance other economic activities. For example, many farmers use income from the sale of sunflower to buy livestock which is considered as a store of wealth. As more famers increase the number of cattle that they own, they require more pasture and this adds pressure on declining land resources. Income from sunflower has also been used to finance the production of onion and chickpea which have become important cash crops in the region (Table 3.2). Farmers in the region also earn more income from the sale of traditional food crops such as maize, sorghum and pearl millet (Table 3.3).

The sale of food crops has caused food insecurity in many families in Singida Region. For instance, sorghum contributes about 25 per cent of food that is consumed in the region (Brown, 2013). Consequently, increased sales of food crops without a corresponding increase in food production, coupled with competition for land. Farmers responded by reducing the mean cultivated area per household (Figure 3.1), is likely to increase food insecurity, especially during drought. This is because many farmers reduced the area under sunflower, reduced the interval in which land lies uncultivated, and adopted non-farm enterprises as the number of farmers who produce sunflower increased concurrently with livestock keeping and cultivation of other crops (Figure 3.2).

3.2.4 Commercialisation pathways

Farmers in Singida choose various livelihood improvement options depending on the resources which they own, leading to different livelihood outcomes and wealth ranks. However, these wealth ranks are not static since people move in and out of wealth categories due to many factors, including individuals' resource allocation strategies and their ability to meaningfully use these resources (Ellis and Mdoe, 2003). To understand the interactions between these factors and livelihood improvement, this study asked FGD participants to randomly list about 60–70 households then rank them according to wealth and farm sizes. The list formed a sample of 963 households comprised of 508 (52.8 per cent) households from Iramba district and 455 (47.2 per cent) from Mkalama district. Out of these, 74 per cent were male and 26 per cent were female. Distribution of the FGD sample by wealth rank shows that about 59 per cent of the households are not wealthy, 30 per cent are averagely wealthy, and only 11 per cent are wealthy (Table 3.3). This data conforms to the distribution from the household survey where small-scale farmers constitute over two thirds of the sample (82.3 per cent), and most of these are classified in the low rank based on the local ranking criteria (Table 3.4).

Table 3.4 presents the mean household resource endowment and the HCI for crops produced by each household. Only two farmers had large farms of over 20ha and consequently this analysis treats these farmers as outliers. Farmers who own medium-sized farms, most of whom would fall in the middle or high wealth rank, reflect a higher mean of sunflower farm

Table 3.4: Distribution of sampled households by wealth, rank, and farm size (qualitative survey)

District	From FGD % by wealth rank				From household survey % of farmers by farm size (scale)			
	N	Low	Middle	High	N	Small	Medium	Large
Iramba	508	64	27	9	317	79.8	19.6	0.6
Mkalama	455	53	33	14	278	85.2	14.8	0
Whole sample	963	59	30	11	594	82.3	17.4	0.3

Source: Authors' own

size, total land owned, and the mean number of cattle, goats, and sheep. Farmers who have no cattle tend to be poorer than livestock owners and caretakers.

Caretakers get nutritional and income benefits from the sale of milk as well as improved farm productivity arising from using manure on their farms. There exists a gender imbalance in the ownership of resources to the disadvantage of FHHs (Table 3.4). The mean schooling years in the sample area is about six years and this is higher in households with medium-sized farms. The MHHs recorded higher mean schooling years especially for younger farmers compared to their older counterparts (Table 3.4). There was no significant difference in the total land owned by younger and older farmers, but older farmers owned more livestock.

The commercialisation index for sunflower (SCI) which represents the percentage of sunflower sold is approximately 70 per cent, with little variation across different farmer categories. However, there are significant differences when for the HCI covering all crops is considered, varying from 51.1 per cent for medium-sized farms to 33.4 per cent for FHHs. The HCI is significantly higher for medium-scale famers compared to small-scale farmers (Table 3.4).

Likewise, the HCI is higher for cattle owners compared to cattle caretakers and farmers who do not own cattle. These two categories have easier and cheaper access to animals. As a result, they can cultivate larger farms and plant crops earlier. Timely planting and early weeding are critical for farmers to achieve higher yields. HCI for MHHs is higher than that of FHHs. Younger farmers have a higher HCI than older farmers. However, it is unclear whether agricultural commercialisation leads to livelihood improvement. This is explored in the next section.

3.3 Livelihood improvement and accumulation

3.3.1 Indicators of livelihood improvement

The study confirms that increasing income from sunflower production, other crops and enterprises has improved livelihoods in Singida Region. As a result of sunflower commercialisation, most people have

Table 3.5: Resource and assets endowment: commercialisation by farmer category (household survey)

Category	Indicator	Classification of farmers									
		Farm size		Cattle ownership			Gender of HH head		Age		Sample mean
		Small	Medium	No. of cattle	Caretaker	Owner	Female	Male	Young (≤ 35 years)	Old (≥ 35 years)	All
Resources and assets	Mean Sunflower farm size	2.3	2.5***	0.7	0.9	1.4***	0.7	1.3***	1.2	1.2	1.3
	Total land	2.3	8.9***	1.9	2.7	4.3***	2.5	2.8***	2.6	2.8*	3.3
	Mean cattle	5.3	18.1***	0.0	6.7	11.4***	3.5	8.2***	5.8	8.0	7.5
	Mean goats	3.2	9.1***	0.5	3.3	6.1***	1.8	4.6***	2.8	4.6**	4.2
	Mean sheep	1.5	6.4***	0.4	1.5	3.4***	1.0	2.5**	1.3	2.6	2.3
	Years of schooling	6.0	6.5**	6.2	5.8	6.0	5.2	6.2***	6.8	5.8***	6.1
Commer-cialisation	% HH selling sunflower	82.0	85.2	76.0	86.8*	84.7	74.6	84.2**	82.2	83.2	85.7
	% crops sold	68.4	73.7	64.4	67.3	72.1	64.4	70.6	69.9	70.9	69.6
	HCI	38.5	51.1***	37.1	40.2	42.5	33.4	41.8**	48.2***	38.5	40.7
	Sunflower commercial-isation index (SCI)	68.4	73.8	64.4	67.3	72.1	64.4	70.6	70.9	69.6	69.8

Note: * = Difference is significant at P = 0.1; ** = Difference is significant at P = 0.05; *** = Difference is significant at P = 0.01; HH = household

Source: Authors' own

benefitted from increased income and employment, availability of animal feed, and the emergence of new income-generating activities. Higher revenue has also increased the taxes which are collected by the government from businesses that are conducted along the sunflower value chain. These benefits have cumulatively improved livelihoods for many people, including farmers, traders, processors, transporters, livestock keepers, consumers and the government.

There has been significant improvement in farmers' houses, since most have upgraded from mud to brick-walled houses, from grass-roofed to corrugated iron sheet-roofed, and from using kerosene lamps as a source of light to solar-powered lighting systems. In addition, some households have constructed rental houses and established businesses in small urban centres like Iguguno and Singida towns. The famers have used these increased incomes to educate their children, access health care services, and provide their families with basic needs such as clothes, food, and other necessities.

There is increased consumption of semi-refined sunflower oil which is now more available in Singida Region. Food security in the region has also improved and farmers can now afford to buy food for nutritional diversity. More families have bought cattle livestock as a store of wealth and experienced improved labour efficiency due to labour provided by the cattle and oxcarts. This has consequently reducing drudgery in farming and other activities such as fetching of water and firewood. More families have also accumulated assets such as furniture, bicycles, motorcycles, cars, solar panels, and oil mills.

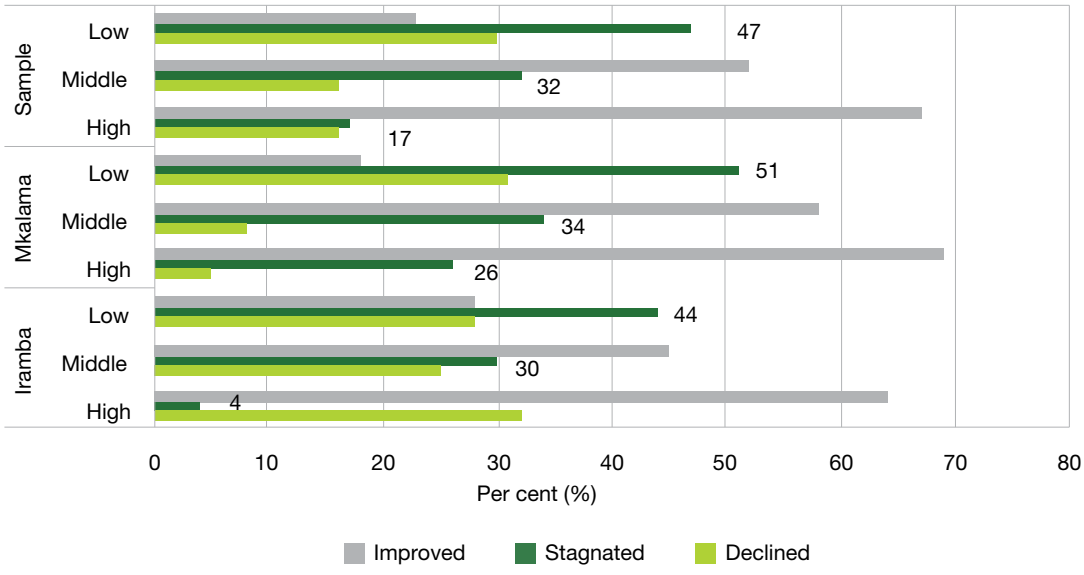
Wilhelm *et al*. (2018) reports similar benefits in which 64 per cent of low wealth groups and 71 per cent of the middle wealth groups became wealthier through sunflower farming. They add that people have invested this wealth in mechanised farming, improved housing, children's education, livestock, and in buying consumer goods. Success from commercialisation of sunflower and other commodities in Singida Region is reflected in the number of assets which are owned by households, the services which they can access, and the households' wealth ranks in a community. However, the position of a household in any wealth rank is not static. Rather, households move to higher wealth levels or decline to lower levels due to various reasons (discussed further in the next section).

3.3.2 Livelihood changes over time: qualitative insights

The wealth status of the 963 households from the 2018 survey was used to determine livelihood improvements based on local indicators. Fifty-nine per cent of the households were clustered in the low rank wealth status, 30 per cent in the middle and 11 percent in belonged in the high rank status (Table 3.3). The household survey similarly showed that about 49 per cent of the households classified themselves as poor, 36 per cent classified themselves as average and 11 percent as considered themselves to be rich (Table 3.5).

High wealth ranking households improved the most, recording 67 per cent improvement compared to 52 per cent improvement reported in the middle and 23 per cent in the low wealth ranks (Figure 3.3). Many low-ranking households declined by 30 per cent compared to only 16 per cent in the middle and high-ranking

Figure 3.3 Change in wealth rank from 2013–2018



Source: Authors' own

households. There were more stagnated households among low-ranking households (47 per cent) compared to 32 in middle-ranking and 17 per cent in high-ranking households. Living conditions of households in Mkalama district improved the most, by 38 per cent, while the lives of farmers in Iramba district improved by 28 per cent. Forty-two per cent of households in Mkalama district stagnated while similar households in Iramba stagnated by 36 per cent. Hoseholds in Iramba declined the most at 28 per cent compared to those in Mkalama which declined by 20 per cent. The proportion of improved low-ranking households was higher in Iramba at 28 per cent compared to that of Mkalama which was 18 per cent.

There was more improvement among high and middle wealth ranks in most villages and this can be attributed to the resource advantages which have been discussed in the preceding sections. There was improvement in the lives of 49 per cent of low-ranking households in places such as Kidaru in Iramba district. These improvements were characterised by increased production of sunflower and higher yields (not only from sunflower but also from other crops like cotton, sorghum, and millet), and more remittances from children or relatives.

Some low-income households, whose livelihoods improved, engaged in non-farm income-generating enterprises such as carpentry, masonry, or small businesses such as kiosks and tea selling businesses. Tyme village, which is dominated by agro-pastoralists declined the most, while Wembere, which is also an agropastoral village, declined the least (Isinika and

Table 3.6: Influence of HCI on MPI, food security and MDD

Variable	Expected sign	MPI		Expected sign	Food security		MDD	
		Coefficient	Robust s.e.		Coefficient	Robust s.e.	Coefficient	Robust s.e.
Constant	+/-	1.093***	0.376	+/-	-0.381	0.29	-0.548*	0.294
Age dummy (Older farmer = 1)	-/+	0.258	0.191	-/+	-0.303**	0.158	0.146	0.157
Farmer category (MSF = 1)	-	-0.332	0.278	+	0.824**	0.278	-0.524	0.236
Years of schooling	-	-0.072*	0.039	+	0.045*	0.027	0.048	0.028
Sex of household head (male = 1)	-	0.265	0.235	+	0.221	0.193	00.009	0.192
Household size (count)	+	0.014	0.032	-	-0.055**	0.027	-0.058**	0.027
Total land (ha)	-	0.014	0.034	+	-0.012	0.041	0.023	0.028
TLU	-	-0.03**	0.0139	+	0.035**	0.012	0.035***	0.013
Non-farm income (TSh100,000= USD 43.5)	-	-0.018*	0.009	+	0.016**	0.009	0.046***	0.016
HCI dummy 2	-	-0.439	0.228	+	0.364**	0.185	-0.131	0.183
HCI dummy 3	-	-0.013	0.232	+	0.376**	0.175	-0.215	0.182
HCI dummy 4	-	-0.166	0.233	+	0.204	0.191	0.379**	0.189
HCI dummy 5	-	-0.279	0.276	+	0.027	0.229	0.552***	0.231
N		357			452		446	
Wald Chi^2 (12)		39.58***			61.44***		44.82***	
p> Chi^2		0.0001			0.000		0.000	
Pseudo R^2		0.0994					0.0979	

*** = p≤0.01; ** = p≤0.05; * = p≤0.1
Source: Authors' own

Mwajombe, 2019). Tyme and Wembere villages are less than 20km apart, but Tyme is drier and its mbuga soils are well suited for the production of cotton, sunflower and sorghum. Wembere village, which lies on higher ground, has many livelihood options, including maize, sunflower, and artisan gold mining. These differences in livelihood outcomes between two villages that are close to each other points to the influence of diverse livelihood options on livelihood outcomes.

Comparison by gender shows that FHHs declined more, or stagnated, compared to MHHs, but there is little difference between FHHs and MHHs in the proportion that improved (Isinika and Mwajombe, 2019). The FGDs attributed this to differences in the risk factors that FHHs and MHHs face. FHHs are more vulnerable at the peak of their child-bearing stage when they handle a larger share of both productive and reproductive roles, while MHHs are more vulnerable in old age. Eighteen per cent of the households that declined from the high wealth rank were all headed by men; FGD members attributed this to old age or prolonged illness and subsequent reduced ability to work (Isinika and Mwajombe, 2019).

Decline or stagnation which affects most middle and low wealth ranking households can be attributed to factors such as lack of livestock, widowhood, landlessness, laziness, alcoholism, poor planning, and lack of teamwork between spouses. Other factors include selling labour early in the season, leading these households to plant late on their farms, incur high-interest on loans borrowed from money lenders, lack of alternative income-generating activities, planting of low-yielding local seed, poor farm husbandry and polygamy (due to the necessary division of the husband's labour among his multiple wives). Reduction in sunflower production was not listed as a strong cause of livelihood decline because most farmers diversified to other crops as a way of coping with declining amounts of land.

The qualitative analysis confirms that livelihood improvement in Singida has been influenced not only by sunflower expansion and commercialisation, but also by other crops and enterprises. Nevertheless, sunflower commercialisation in the region has played an important role in improving the lives of many people who engage in sunflower production and trading. Notably among farmers, about 92 per cent of the households whose living conditions stagnated or declined had reduced or stopped sunflower production, and none of the households in the low wealth rank had increased sunflower production, probably due to inadequate resources.

3.3.3 Quantitative livelihood indicators

Qualitative indicators of wellbeing, as presented in the preceding section, point to a positive trend over time. In this section we use quantitative data and analysis from the household survey to verify qualitative assertions regarding the influence of agricultural commercialisation on livelihood improvement. This analysis shows that the influence of sunflower commercialisation on livelihood improvement is not as high as that of the commercialisation of all crops measured by the HCI as a ratio of the value of all crops sold over the value of all crops produced. We compare the influence of HCI and other household characteristics across three indicators of livelihood: MPI, food security and MDD.

According Table 3.6, poverty reduction, which is measured by a decline of the MPI, is significantly influenced by Total Livestock Units (TLUs), non-farm income and a farmer's years of schooling. Other factors, whose coefficients are negative, have a poverty-reducing effect, although not significant. They include the farmer's category where small-scale farmers are more likely to be poorer than medium-scale farmers, total land owned, and crop commercialisation from the third to the fifth quintile. The positive coefficient on the male dummy variable is contrary to expectation, since the average MPI for MHHs (0.37) is lower than that of FHHs (0.39).

Based on subjective poverty, 69.5 per cent of FHHs and 49.1 per cent of MHHs perceive themselves as poor. The age of the household head and the household size also have a poverty increasing effect in that older farmers are more likely to be poorer with a mean MPI of 0.39 compared to 0.33 for younger farmers. The effect of these variables is stronger on reducing food security and MDD (Table 3.5). Since sunflower commercialisation is a significant component of the HCI. This analysis shows that the influence of sunflower commercialisation on livelihood improvement is not as high as that of the commercialisation of all crops measured by the HCI as a ratio of the value of all crops sold over the value of all crops produced.

4 SYNTHESIS AND CONCLUSION

The study findings support the assertion that although sunflower has been important in the transformation of Singida Region, leading to the accumulation of assets and livelihood improvement, sunflower production is only part of the story. Sunflower-related activities have interacted with other livelihood activities to create many livelihood options and pathways for men and women in Singida region. The livelihood pathways and strategic choices of different people begin from the resources that they own, and the interactions between local institutional and cultural dynamics with national and regional policy and business environments.

Agrarian change in Singida is characterised by changing dynamics in land use and social relations including ethnic influences, class and gender. This change is also characterised by economic relations such as resource ownership and control of power in and outside households. Many factors have interacted to shape the existing opportunities for commercialisation not only of sunflower but also other crops and livestock, as well as expansion of small and micro enterprises.

Proceeds from the sale of sunflower have been used to establish or expand other crop enterprises, buy livestock, and invest in non-farm activities inside and outside Singiga Region. In addition, sunflower commercialisation has enabled farmers to construct better houses, buy clothes and household assets, invest in children's education and improve their household nutrition, hence benefiting people in the region in one way or another. Nevertheless, the study shows that as gender dynamics changed and gave men more control in marketing and processing, women were marginalised in the control of income from the sale of sunflower. Some women used cultural institutions to re-negotiate and carve out new opportunities and spaces, and these changed power relations and livelihoods in households, leading to more inclusive resource control and empowerment outcomes, as was witnessed in Isene village.

While women in most of the villages maintained the status quo, some silently withdrew their labour from sunflower production as testified by one woman in Wembere village, she is not alone. This is consistent with Berry (1993) when she states the difficulty of controlling African labour which is often mobilised through social networks such as the family. Although the cultural practice of *nsoza* is still common in most villages, changing cultural norms were reported in Zinziligi, where declining conjugal trust has eliminated *nsoza*, since men do not want to risk losing land to their wives in the event of a divorce. Quantitative data analysis confirms this since the HCI, which covers all crops is positively correlated to women's empowerment, SCI is not (Mosha et al., 2021).

The interaction between sunflower, livestock and production of other croups is multifaceted and involves complementarity through ADT services and manure on the one hand and sunflower seed cake as animal feed on the other hand. As crop production extended to traditional grazing areas, more income from sunflower and other crops was used to buy livestock which is considered as a store of wealth, and hence raise the farmers' social standing. The number of households that owned cattle increased by nearly 30 per cent between 2008 and 2018. Despite the westward migration of some livestock to Itigi and Ikungi districts, some farmers who owned large herds of cattle remained in their villages, and partly distributed their herd to different caretakers. Meanwhile, most of the farmers continued to use money earned from the sale of crops and income-generating activities to buy more livestock. This increased pressure on the land and consequently raised concerns about the sustainability of fragile semi-arid ecosystems in Singida Region.

Farmers adapted to ongoing dynamics through diversification and institutional changes such as the evolution of livestock caretakers, some of whom have managed to move up to higher wealth ranks. Social networks have also remained important in terms of labour relations for tillage and weeding services. Some of the medium-scale famers also provide rental ADT services to large-scale famers. Small and middle-scale farmers who do not own cattle depend on ADT services from medium-scale farmers. Such dependency, however, sometimes delays planting, thereby increasing these farmers' vulnerability to drought and late planting.

The study shows that during the last 20 years, upward social mobility cannot be attributed to sunflower commercialisation alone. Livelihood options have been

diversified, with a higher proportion of households now selling maize, sorghum, and common beans compared to 2002/03. Other options include income-generating activities and remittances from outside the village. The high wealth rank households improved the most but they did not necessarily engage in sunflower production, as they had significant non-farm economic activities such as shops, milling machines, transport, and formal employment.

Households who reduced or stropped producing sunflower did so due to resource constraints, low prices, or ill health. The proportion of declining households is higher among FHHs, but also among those classified as lazy and those who engage in excessive consumption of alcohol. While external facilitation from the government and other development agencies is important, declining land for crops and livestock expansion needs to be addressed by the community, with support and facilitation from the district and regional authorities to improve productivity. Local communities should take responsibility to address prevailing challenges that hinder commercialisation and hence reduce the rate of livelihood improvement.

The analysis presented in this study has benefited from the three contextual frameworks presented earlier in this paper. The evolutionary and historical perspectives were relevant when analysing the key informant interviews and FGD data. The structural political economy perspective was used to analyse historical data from various published works and data from the household survey conducted in this study. Combining the perspectives shows that, over time, people's livelihood options are shaped by different factors which range from the household (e.g., divorce) to the level of national policy (e.g., electrification). These factors interact in different ways for different individuals based on the amount of resources that they own and the prevailing circumstances which may allow them to take advantage of specific opportunities and reshape power relations.

In Singida Region, access to many diversification options, particularly in agricultural commercialisation seems to have improved outcomes for most people. There is a scarcity of literature on sunflower and livelihood in the study area. Nonetheless the evidence presented here provide a compelling argument to support a diversified portfolio of livelihood options to minimise risk and improve the lives of farmers in this fragile semi-arid Singida region.

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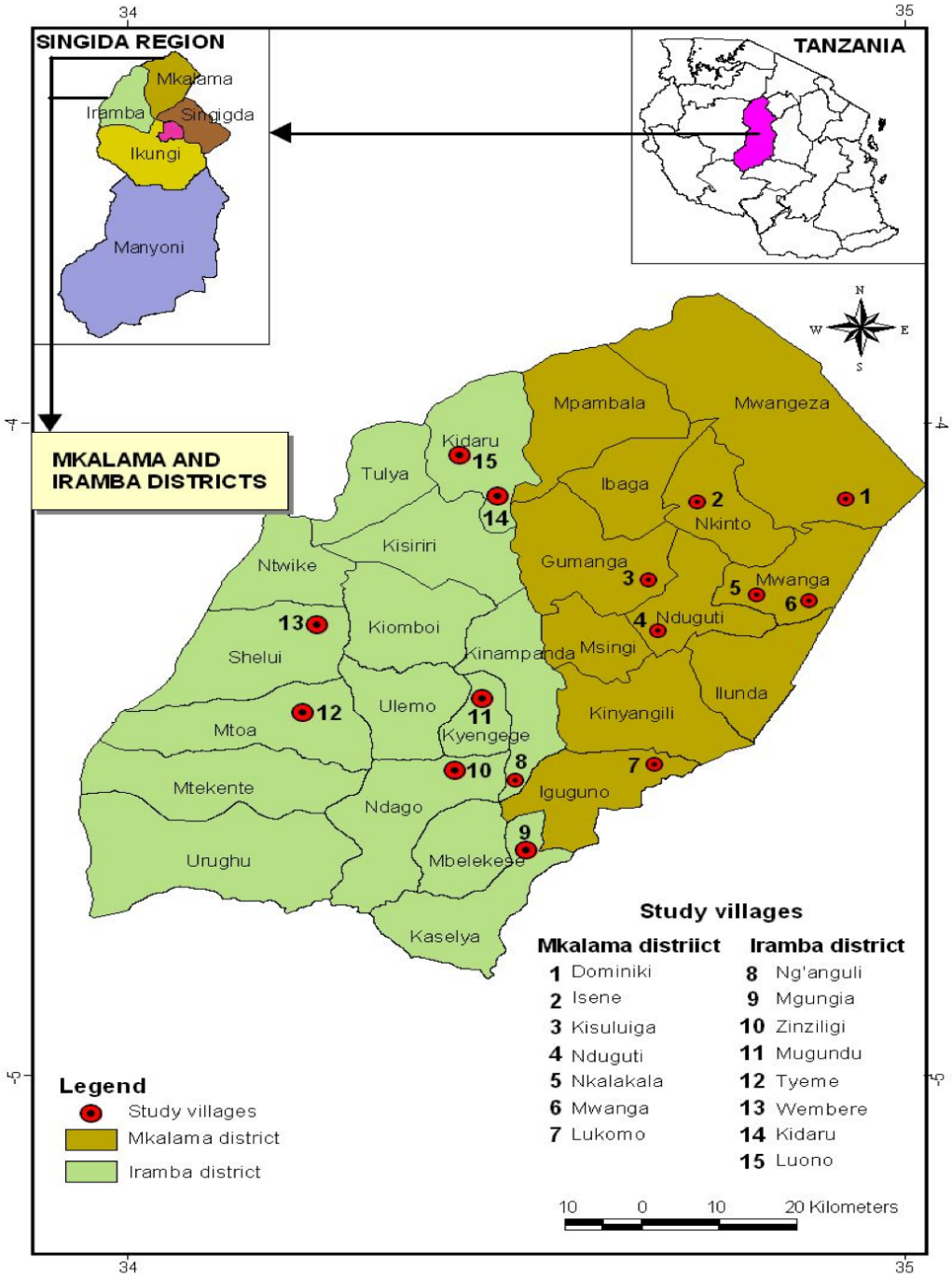
ANNEX

Annex 1 Map of Singida Region: Iramba and Mkalama districts



Source: Constructed by Yusufu Matembo based on Map of Tanzania administrative boundaries (URT, 2012b)

ENDNOTES

1. The United Republic of Tanzania, commonly known as Tanzania, is a union between Mainland Tanzania, formerly known as Tanganyika, and Zanzibar. The two countries were united in1964.
2. APRA is a five-year research consortium that is working to identify the most effective pathways to agricultural commercialisation that empower women, reduce rural poverty and improve food security and nutrition security in Sub-Saharan Africa
3. Under NREP, Tanzania has the ambition increase the electricity access rate from 24 per cent in 2016 to 35 per cent by 2022.
4. One bag of sunflower seed weighs between 65 and 70kg. In this report we use the minimum of 65kg for consistency.

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